Final Synopsis

For the fulfillment of Ph.D. degree in CHEMISTRY

On

"SYNTHESIS AND CHARACTERIZATION OF SCHIFF BASES AND THEIR METAL COMPLEXES CONTAINING BIOACTIVE HETEROCYCLES."

submitted To

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Thesis title : "SYNTHESIS AND CHARACTERIZATION OF SCHIFF BASES AND THEIR METAL COMPLEXES CONTAINING BIOACTIVE HETEROCYCLES."

Subject : Chemistry

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SYNOPSIS

Schiff bases are characterized by an imine group **–N=CH-**, which helps to clarify the mechanism of transamination and racemization reaction in biological system. It exhibits antibacterial and antifungal effect in their biological properties. Schiff base ligands are essential in the field of coordination chemistry, especially in the development of complexes of Schiff bases because these compounds are potentially capable of forming stable complexes with metal ions and Studies show that the metal complexes of Schiff's base ligands have better antimicrobial activities as compared to Schiff's bases.

Complexes of transition metal ions with multidentate organic ligands have been the subject of intensive research because they not only have interesting spectral and magnetic properties, but they also possess a diverse spectrum of biological activities. Furthermore, development in the field of bioinorganic chemistry has also led to an increased interest in complexes of N, O-donor ligands since it has been recognized that many of these complexes may serve as models for biologically important species having N and O as bonding sites.

Hydrazones play an important role in inorganic chemistry, as they easily form stable complexes with most transition metal ions. The development of the field of bioinorganic chemistry has increased the interest in hydrazone complexes, since it was recognized that many of these complexes may serve as models for biologically important species. In context to previous research, number of complexes of transition metals with isonicotinoylhydrazone ligands were obtained and characterized. Biological activities associated with hydrazones and their metal complexes prompted us to synthesize some new complexes.

•Tentative list of chapters to be included in thesis:

CHAP 1: Introduction

CHAP 2: Synthesis and characterization of ligands

CHAP 3: Synthesis and characterization of metal complexes

CHAP 4: Biological activity of complexes

CHAP 1: Introduction

This chapter describes the general introduction and literature survey associated with various pharmacological and biological properties of hydrazones and the importance of isoniazide in medicine. Extensive literature is available on the synthesis, structural characterization and applications of metal complexes of isonicotinic acid hydrazide ligand. Isoniazid (isonicotinic acid hydrazide; INH) is a drug of proven therapeutical importance, used against wide spectrum bacterial ailments, *viz.*, tuberculosis. Hydrazones derived from condensation of isoniazid with aldehydes have been found to show better antitubercular activity than isoniazid.

CHAP 2: Synthesis and characterization of ligands

It concerns with the synthesis and characterization of different isonicotinic acid hydrazones. These different isonicotinic acid hydrazones were obtained by condensation of substituted aromatic aldehyde with INH in presence of ionic liquid as catalyst. The procedure and technique employed for characterization of these compounds by elemental analysis, IR, ^{1}H-NMR, UV-Vis spectroscopy have been included.

CHAP 3: Synthesis and characterization of metal complexes

In this chapter information regarding synthesis and characterization of metal complexes of isonicotinic acid hydrazones and the experimental data on solution conductivity, magnetic susceptibility, thermoanalytical and XRD studies of Cu(II), Ni(II), Zn(II) and Co(II) and Cr(III) complexes of isonicotinic acid hydrazonesare presented and discussed.

CHAP 4:Biological activity of complexes

This chapter deals with the antibacterial and antifungal studies of synthesized ligands and their metal complexes. It is divided in two sections.

Section I includes antibacterial studies of synthesized ligands and their metal complexes tested at concentration of 100ppm solution against gram positive and gram negative bacteria. The inhibitory zone and data are presented.

Section II includes introduction to fungi. The synthesized ligands and their metal complexes screened for their antifungal activities. The compounds were screened at 100ppm concentration against fungi. The inhibitory zone and data corresponding to ligand and metal complexes are presented.

Original Work

The different isonicotinic acid hydrazones have been obtained by condensation of substituted aromatic aldehyde with isoniazide in presence of ionic liquid as catalyst. The obtained ligands have been characterized by different analytical techniques like IR, ^{1}H-NMR, UV-Vis spectroscopy. The complexes of transition metals Cu(II), Ni(II), Zn(II) and Co(II) and Cr(III) with isonicotinic acid hydrazone ligands have been obtained and characterized by different analytical technique. The experimenta data on solution conductivity, magnetic susceptibility, thermoanalytical and XRD studies of Cu(II), Ni(II), Zn(II) and Co(II) and Cr(III) complexes of isonicotinic acid hydrazonesare have also been studied. The synthesized ligands and their metal complexes were studied for their antibacterial and antifungal activity for the first time.

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